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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/668,947	09/23/2003	Margaret Ghiron	SIO-0106	3887

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EXAMINER
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PAK, SUNG H

ART UNIT	PAPER NUMBER
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2874

DATE MAILED: 01/19/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/668,947

Applicant(s)

GHIRON ET AL.

Examiner

Sung H. Pak

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☐ Responsive to communication(s) filed on \_\_\_\_.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-48 is/are pending in the application.
- 4a) Of the above claim(s) 25-48 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-24 is/are rejected.
- 7) ☒ Claim(s) 6 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 28 July 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)  | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____.  |

**DETAILED ACTION**

***Election/Restrictions***

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-24, drawn to an optical coupling arrangement, classified in class 385, subclass 36.
- II. Claims 25-48, drawn to a method of making optical coupling arrangement, classified in class 385, subclass 36.

The inventions are distinct, each from the other because of the following reasons:

Inventions Group II and Group I are related as process of making and product made. The inventions are distinct if either or both of the following can be shown: (1) that the process as claimed can be used to make other and materially different product or (2) that the product as claimed can be made by another and materially different process (MPEP § 806.05(f)). In the instant case the product as claimed can be made by another and materially difference process, such as deposition process without patterning and etching.

Because these inventions are distinct for the reasons given above and the search required for Group II is not required for Group I, restriction for examination purposes as indicated is proper.

During a telephone conversation with Wendy Koba on 1/11/2005 a provisional election was made without traverse to prosecute the invention of Group I, claims 1-24. Affirmation of this election must be made by applicant in replying to this Office action. Claims 25-48 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

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Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

### ***Drawings***

The drawings were received on 7/28/2004. These drawings are accepted.

### ***Claim Objections***

Claim 6 is objected to because of the following informalities: claim 6 recites “the species and concentration of dopants”, however this recitation lacks proper antecedent basis.

Appropriate correction is required.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-4, 6-11, 13-19, 24 are rejected under 35 U.S.C. 102(e) as being anticipated by Deliwala (US 2003/0118306 A1).

Deliwala discloses an optical device with all the limitations set forth in the claims, including: a silicon optical waveguide formed in a surface layer of a silicon-on-insulator (SOI) wafer ('106' Fig. 53); a silicon-based prism coupler permanently attached to the SOI wafer in a manner such that first, base surface of the said prism coupler is disposed substantially parallel to and mated with an upper waveguide surface of the SOI wafer, (Fig. 53, paragraph 0375); the refractive index of the silicon-based prism coupler at least equal to the refractive index of the silicon optical waveguide (paragraph 0350); an evanescent coupling region disposed between the silicon-based prism coupler and the silicon optical waveguide ('5106' Fig. 53); wherein the thickness of the silicon optical waveguide is less than 1  $\mu\text{m}$  (paragraph 0350); wherein the optical waveguide is configured to support propagation of a single mode optical signal (paragraph 0468); wherein the optical waveguide comprises a multi-layer structure of silicon-based layers, separated by relatively thin dielectric layers (paragraph 0124); wherein the species and concentration of dopants included in the optical waveguide are specified such that the refractive index of the prism coupler is at least equal to the refractive index of the optical waveguide (paragraph 0166 and 0350); wherein the evanescent coupling region comprises a cavity or a thin film layer of a material comprising a refractive index less than the refractive index of both the prism and the optical waveguide (paragraph 0352- since the evanescent coupling region is air, the refractive index of this region is inherently less than the refractive index of prism and the waveguide); wherein the evanescent coupling layer is formed as a surface layer across the first base surface of the prism (Fig. 54), and as a surface layer above the optical waveguide (Fig. 53); wherein the evanescent coupling region may be a multi-layer structure ('5106' Fig. 53); wherein the evanescent coupling region comprises a layer of constant thickness

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(Fig. 53); wherein the cavity comprises corner edges that sharply truncate an optical beam (Fig. 55); wherein the evanescent coupling region comprises a layer of tapered thickness (Fig. 55).

Regarding claims 16-18, these claims are apparatus claims reciting process limitations. It has been determined that, for product claims, "determination of patentability is based on the product itself. The patentability of a product does not depend on its method of production." In *re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See also MPEP 2113. Since Deliwala teaches all the structural limitations of claims 16-18, Deliwala anticipates the claims 16-18.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Claims 5, 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deliwala (US 2003/0118306 A1).

Regarding claim 5, Deliwala discloses an optical device with all the limitations set forth in the claims as discussed above, except it does not explicitly teach the use of anti-reflective coating on the surface of the prism.

However, the use of anti-reflective coating on optical coupling prisms is well known and common in the art. The use of anti-reflective coating advantageously lowers coupling loss due to signal back-reflection during the coupling process. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Deliwala device to have anti-reflection coating on the prism surface.

Regarding claim 12, Deliwala discloses an optical device with all the limitations set forth in the claims as discussed above, except it does not explicitly teach the use of silicon dioxide evanescent coupling layer.

However, silicon dioxide coupling layers are well known and common in silicon optical waveguide devices. The use of silicon dioxide coupling layer is advantageous and desirable because it provides suitable refractive index values for efficient light coupling. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Deliwala device to have silicon dioxide coupling layers.

Claims 20-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Deliwala (US 2003/0118306 A1) in view of Minami et al (US 6,021,239).

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Deliwala discloses an optical device with all the limitations set forth in the claims as discussed above, and further including first and second prisms for inputting and outputting optical signals, respectively. However, it does not explicitly teach the use of trapezoidal prisms.

On the other hand, Minami explicitly teaches the use of trapezoidal prisms for light coupling (Fig. 1-2). The use of trapezoidal prisms is advantageous and desirable because it allows for optimal coupling angle which enhances coupling efficiency of the device. Therefore, it would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the Deliwala device to use trapezoidal prisms.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Yokomori et al (US 4,877,301), Yokomori et al (US 5,235,589), Rigrod (US 3,883,221), and Brazas, Jr. (US 4,979,788) disclose prismatic optical couplers for coupling optical signals into optical waveguides.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sung H. Pak whose telephone number is (571) 272-2353. The examiner can normally be reached on Monday- Friday, 9AM-5PM.

The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.



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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Sung H. Pak  
Examiner  
Art Unit 2874

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